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Figure 1

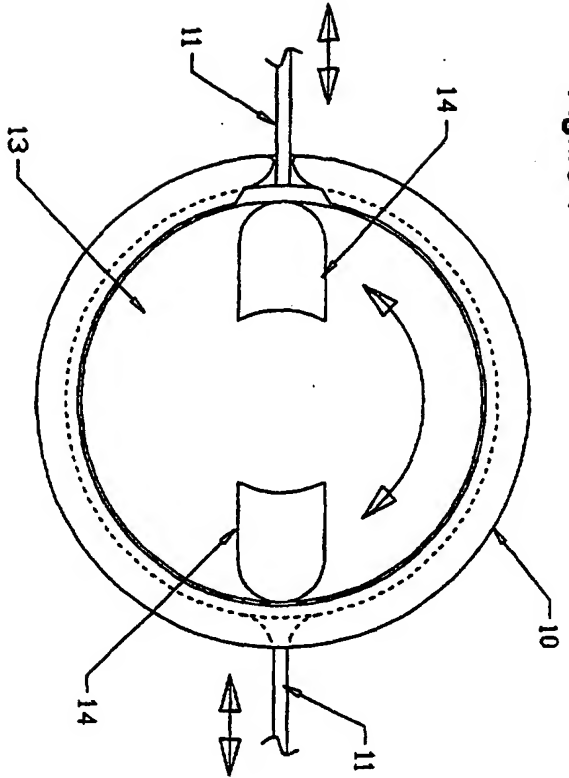


Figure 2

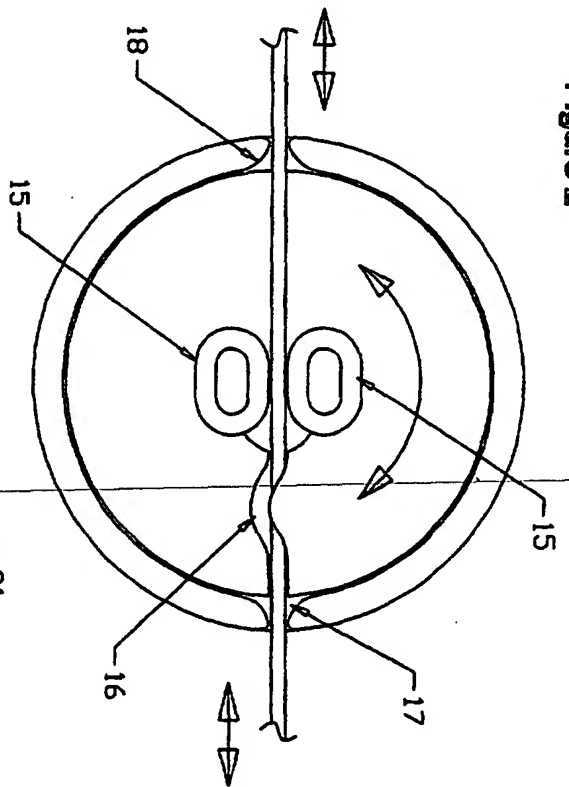
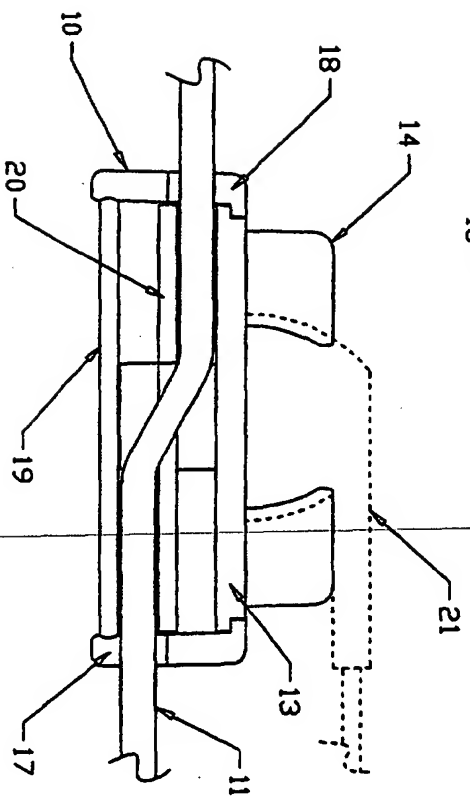


Figure 3



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CABLE WINDER FOR MOBILE TELEPHONE 'HANDS-FREE' CABLES
OR OTHER FLEXIBLE ELEMENTS

The invention primarily relates to a storage device for mobile telephone 'hands-free' cables such as are connected to mobile telephones to enable a conversation to take place without holding the telephone itself. It also relates to storage devices for other electrical cables and flexible elements. For example, the invention is suitable for storing the electrical cable of a personal stereo headphone set, or other electrical appliances such as speakers, irons, etc. and for flexible elements such as garden hose pipes, ropes, cords, etc.

The electrical cable provided with many domestic appliances is usually of the maximum possible required length for its full usage. For example, a 'hands-free' cable for a mobile telephone is typically one metre long, to enable the telephone to be placed on the passenger seat in a car, next to the driver who is participating in a telephone conversation in the driver's seat. The length is necessary to reach from the ear of the user to the telephone which is placed down on the next seat, or indeed to be held in the hand at waist height, whilst walking with the other (earpiece) end in the user's ear. Accordingly, it is always the case that when the conversation ends, the cable has to be somehow tidied away – and the only current option is to twist it up in a disordered ball, or wind it untidily around the mobile telephone. Typically, when placed in a bag or pocket like this, the cable falls away from the telephone and next time the user needs to quickly answer a call, the cable is in a knot or has attached itself round other items in your bag or pocket, such as a set of keys, or indeed the phone itself. This makes quick answering of a call impossible as the cable must first be unwound, unknotted from itself or untied from whatever article it has become entangled with.

An object of this invention is to provide a means to a) store the 'hands-free' cable, or other element, securely and tidily between telephone calls whilst b) allowing rapid and urgent unwinding of the cable or element for immediate answering of an incoming call (or other purpose). This action would be performed by pulling the opposing ends of the element outwardly from each other, causing both ends to unwind within the invention and reform the full length of the element.

An object of this invention is also to provide a means to provide storage without the need to disconnect the cable or element from the telephone or other device between calls (to facilitate

quick answering of calls) or other usage – i.e. a means to wind the cable or element whilst the said cable or element is still attached to the telephone or other device to avoid the delay of plugging the cable back in before answering a call or further usage. Normally, it is not possible to wind a 'hands-free' or other cable which has one end attached to a mobile telephone without a) severing the cable to install moving contacts or b) unplugging the cable from the device. Failure to perform either of these actions whilst winding from one end will cause jamming of the cable in the device, and/or twisting of the cable as is therefore currently impracticable.

An object of this invention is also to provide a means to attach the storage device to a mobile telephone.

The design of a 'hands-free' cable is such that approximately 12 centimetres from the earpiece there is located a microphone which, during conversation, hangs at approximate mouth-height. The microphone itself cannot be wound into a storage device as it is several times the diameter of the cable to be wound, and therefore it is desirable to secure the earpiece to the storage device, rather than to leave approximately 12 centimetres of cable between the microphone and the earpiece (at the end of the cable) still hanging below the invention. Another object of this invention is, therefore, to also store the earpiece of the cable securely, in addition to the cable itself, rather than leave the earpiece, and indeed the microphone, still hanging out of the end of the invention, below the mobile telephone.

Accordingly, this invention provides a storage device to be connected to such articles between the ends thereof and to wind in both ends of the article from its approximate centre, thus eliminating the need to sever the cable to install moving contacts, or unplug the cable, and to securely store the earpiece also.

The storage device may comprise a housing ring formed with two diametrically opposed openings to receive both said ends of the article and a winding spindle assembly.

The device is provided with spindle formations defining an axially facing slot to receive the article. Said formations are preferably straight at their centre, but curved at their edges on all opposite sides, allowing the article to be wound either clockwise or counter-clockwise around the spindle thus reducing the likelihood of breakage of the article after persistent windings.

This allows operation by either right or left-handed users, whereas an S-shaped path would only allow operation in a clockwise direction, and consequently render the storage device useless to left-handed operators.

Preferably, the storage device comprises a dual-purpose handle comprising two protrusions which not only facilitate winding-up of the cable using a thumb and finger 'clockwork' winding action, but also double as clips to which the 'hands-free' earpiece (of which there is only normally one) can be secured between.

The device may instead be provided with two rubber plugs to which personal stereo earphones (of which there are normally two) can be secured into alternatively.

Also, the device may comprise a central divider plate extending circumferentially with respect to the spindle and serving to divide the housing into two portions helping to receive the two portions of the article on opposite levels of the storage device and keep them in place so as to avoid entanglement between the two levels.

The storage device may comprise two main pieces including a housing ring and spindle assembly, together with a spindle retaining plate therefore.

A 'hands-free' cable is particularly weak at its connections on either end. Consequently automatic rotation as with a spring-loaded mechanism would put excessive stress on the components of the article during unwinding – when a significant amount of pulling against the resistance of the spring is inevitable. Preferably, therefore, the device is provided with manual rotation means using a thumb and finger method for maximum rotational force with least physical exertion.

The device may indeed, however, optionally comprise a spring-loaded winding spindle mounted for rotation in a housing, wherein to prevent relative rotation between the winding spindle and the housing there is arranged a locking device moveable by operation of a ratchet stop mechanism. The spiral spring is tensioned and thereby is capable of rewinding the article fully without the need for manual operation.

The invention also provides a storage device comprising any novel feature disclosed herein or any novel combination of features disclosed herein.

In an embodiment described below, a storage device for a mobile telephone 'hands-free' cable comprises a housing ring having a central spindle formed with a groove or recess to accept the cable axially. On one side of the housing portion is a manual rotation means, comprising a dual-purpose handle consisting of two protrusions which not only facilitate winding-up of the cable using a thumb and finger motion, but also double as clips to which the 'hands-free' earpiece can be secured between.

The other main piece is a housing ring which can be attached onto, and rotate around, the spindle, and having two slots at diametrically opposed positions, each large enough to allow only the cable to pass freely through.

An embodiment of the invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 shows a plan view of a storage device having a mobile telephone 'hands-free' cable 11 located and showing the finger and thumb handles 14 in a fully unwound position.

Figure 2 shows a plan section through the apparatus of *Figure 1* and showing the cable 11 in a fully unwound position relative to the spindle assembly 13, 14, 15, 20 and housing ring 10, leaving the spindle assembly 13, 14, 15, 20 free to rotate in the housing ring 10, thus winding the cable 11 around the spindle part 15.

Figure 3 shows a side section through the storage device showing the spindle retaining plate 19 in position, two cable access slots 17, 18, the cable 11 path through the spindle assembly 13, 14, 15, 20 and the 'hands-free' earpiece 21 in location between the thumb and finger handles 14.

As shown in the drawings, a storage device for electrical cables and like articles comprises a winch means 14 including a spindle assembly 13, 14, 15, 20 formed with a wave-shaped slot 16 and located within a housing ring 10.

A cable dividing disc 20 is shown along with a spindle retaining plate 19 which is of a dished configuration forming a base to secure the spindle assembly.

Cable inlet openings 17, 18 are formed in housing ring 10. Spindle retaining plate 19 can be clipped into housing ring 10 and finger and thumb handles 14 are provided to rotate the spindle assembly and also provide storage of the 'hands-free' earpiece 21.

A dividing plate 20 extends circumferentially around spindle part 15 to divide the winding cavity into two portions, one for one end of the cable to be wound, and the other for the opposite end.

The whole assembly may be formed from moulded components of plastics suitable for a particular application, for example Polycarbonate.

In use, housing ring 10 and spindle assembly as a whole 13, 14, 15, 20 are first disassembled for cable positioning. Approximately the midpoint of the 'hands-free' cable 11, between the plug at one end and microphone at the other, is laid onto the spindle part 15. Half of the cable is taken through the wave-shaped slot 16 and through to the opposite level on a higher or lower altitude. One end of the cable 11, is passed through the housing ring 10 and the spindle assembly 13, 14, 15, 20 is pushed into place so that one half of the cable 11 runs freely through the cable inlet opening 17, and the opposite half of the cable 11 runs freely through the cable inlet opening 18. The spindle retaining plate 19 is then pressed home thereby securing the spindle assembly 13, 14, 15, 20 within the housing ring 10.

The passing of one end of the cable 11, through the housing ring 10 during initial setup allows the cable inlet openings 17, 18 to be diametrically opposing. This allows the cable inlet slots 17, 18 to measure only half the height of the housing ring 10 on each opposite side, allowing only the cable 11 to pass freely through them, whilst preventing foreign materials such as dust from entering the cavity and hindering usage.

To take up the slack in the cable 11, and with the storage device attached to the telephone by means of a hook-and-loop fastening pads or magnetic pads, the telephone is held in one hand

and the spindle assembly is rotated clockwise or counter-clockwise by means finger and thumb levers 14.

Rotation of the finger and thumb handles 14 causes the cable 11 to be wound in from both ends around the spindle part 15, but separated from entanglement with each other by the dividing plate 20, with the benefit of the wave-shaped slot 16 which keeps each half of the cable in position at its relevant altitude.

To pay out the stored cable, the latter is pulled outwards from one side of the storage device, with the mobile telephone held in the other hand, which causes the hook-and-loop fastening or magnetic pads to disengage from the back of the telephone and run freely, thus ultimately paying out the cable from both ends with the storage device floating freely between both ends, now disengaged from the mobile telephone.

Alternatively, the cable is pulled outwards from both sides of the storage device, with the device not being held whatsoever by the mobile telephone or other means, thus ultimately paying out the cable from both ends.

The diameter of the cable 11 and the minimum safe radius of bend of the cable determine the size of the slot formed in spindle part 15 and the diameter of the spindle part 15 itself. The amount of slack to be stored determines the height of the spindle part 15 in the axial direction and the diameters of housing ring 10 and spindle retaining plate 19.

The storage device of the invention is applicable for use with cable to most if not all electrical appliances such as personal stereo headsets, hi-fi speakers, microphones, television sets, video recorders, radios, lamps, washing machines, kettles, lawnmowers, upright vacuum cleaners, telephones, computers, and so on. It will be appreciated that the storage device will enable the substantial elimination, most importantly however, of the 'spaghetti' of jumbled wire which normally accompanies a mobile telephone 'hands-free'.

It will be appreciated that the embodiments of the invention described above not only provide an important tidying function, but also, in the instance of a 'hands-free' cable for example, a more fundamental money-saving function in that by storing away excess cable safely, damage to such cable due to pulling it out of a bag whilst its earpiece is caught up with other items, or

indeed shutting it in a car door, etc., etc. is greatly reduced, thus lengthening the life of the element..

Many modifications could be made in the above described embodiment while remaining within the scope of the invention, such modifications include changes in the shape and size of the spindle and the housing portions 10, 19, the size and relative dispositions of the openings 17, 18, and indeed the form and location of the winding means 14.

CLAIMS

1. A storage device for mobile telephone 'hands-free' cables, and like articles, the device being adapted to be connected to such an article between the ends thereof and to wind in both ends of the article simultaneously towards a common centre in either direction thus reducing weakening of the cable at its centre due to repeated kinking, and to include a secure means of attaching the earpiece.
 2. A storage device according to claim 1 comprising a rotary spindle operated by dual-purpose thumb and finger handle arrangement which features rubber locating elements which double as a secure receptacle for the 'hands-free' earpiece.
 3. A storage device according to claim 2 wherein the spindle assembly is arranged so that a central portion of an article to be wound can be inserted into the spindle in an axial direction with respect to rotation of the spindle assembly.
 4. A storage device according to claim 2 or claim 3 wherein the spindle comprises formations defining an axially facing slot to receive the article to be wound.
 5. A storage device according to claim 4 wherein said formations are shaped to cause the article to be wound to follow a generally straight path curving towards each end of the formation thus allowing either clockwise or counter-clockwise rotation suitable without significant damage or weakening to the cable.
 6. A storage device according to any one of the preceding claims comprising a housing formed with two diametrically opposing openings to receive both ends of the cable and retain one end secured on one side of a dividing plate according to claim 10, and the other end secured on the other side of a dividing plate, therefore allowing concentric turns in opposite directions on adjacent levels. Thus winding the cable in two layers rather than one substantially decreases the overall width of the device, as the cable winds upon itself giving maximum storage with minimum volume, which is particularly desirable with small items such as mobile telephones.
 7. A storage device according to claim 2, or any one of claims 3 to 6 when dependent on claim 2, wherein the spindle assembly comprises a central divider plate extending circumferentially with respect to the spindle and service to divide the housing into two portions serving to receive the two portions of the article on opposite sides of the storage device without entanglement.
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8. A storage device according to claim 6 or claim 7 wherein the device comprises three main pieces including a main housing ring and spindle assembly, together also with a spindle retaining plate therefore.
 9. A storage device according to any one of claims 2 to 8 wherein the spindle assembly is provided with manual or spring-loaded rotation means.
 10. A storage device according to any one of the above claims with a specially formed wave-shaped slot which prevents the element from passing axially back through the dividing plate in normal use, thus keeping it on the separate levels for safe and tidy winding without entanglement.
 11. A storage device according to any one of the preceding claims which features cable inlet slots formed large enough that only the cable itself can flow freely through them, thus eliminating the risk of foreign articles such as dust from entering the innards of the storage device, therefore maximising the life of the device, and preventing wear or damage to the element to be wound.
 12. A storage device according to claim 11 which features a housing ring to which half of the cable can be passed through during initial setup, for the purpose of allowing the cable access slots to be diametrically opposing whilst still allowing the element to be inserted axially onto the centre of the spindle. This unique design allows the cable or element inlet slots to measure only half the height of the housing ring on each opposite side, allowing only the cable or element to pass freely through them, rather than foreign articles.
 13. A storage device for mobile telephone 'hands-free' cables, electrical cables, or any other flexible elements which need to be wound from their centre rather than one end.
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Amendments to the claims have been filed as follows

1. A storage device for an electrical cable having an earpiece, the
5 device comprising a housing and a member rotatable in the housing
and adapted to receive the cable, the arrangement being such that,
when the device is located intermediate ends of the cable, rotation of
the member relative to the housing causes winding of the cable, in
directions from both of the said ends, into the housing and around
10 the member, wherein there is provided securing means for attaching
the earpiece.
2. A device as claimed in Claim 1 wherein the securing means is
located on the member.
- 15 3. A device as claimed in Claim 2 wherein the securing means
comprises a pair of spaced components adapted to receive the
earpiece therebetween.
- 20 4. A device as claimed in Claim 3 wherein the components comprise
handle means for effecting winding of the cable into the housing.
5. A device as claimed in Claim 4 wherein the components are of
resilient material.
- 25 6. A device as claimed in any one of the preceding Claims wherein the
~~member and the housing combine to form a part of channels for~~
receiving the cable, the housing having a first inlet in
communication with one of the channels and a second inlet in
30 communication with the other of the channels.

- 11
7. A device as claimed in any one of the preceding Claims wherein the member comprises a pair of spaced parallel discs, one of which is provided with a substantially, radially extending recess extending inwardly from a peripheral edge thereof.
- 5
8. A device as claimed in Claim 7 wherein the recess is of undulating configuration in a radial direction of the discs.
9. A device as claimed in Claim 7 or Claim 8 wherein the member
10 comprises a pair of spaced parallel spindles extending axially of the discs.
10. A device as claimed in Claim 9 wherein the spindles are each of substantial oval configuration, in radial cross-section of the spindles,
15 with parallel rectilinear sides.
11. A device as claimed in Claim 10 wherein the dimensions of the spindles are such so as to not to cause the cable to kink in use.
- 20 12. A device as claimed in any one of the preceding Claims wherein the member is provided with a retraction spring.
13. A device as claimed in any one of the preceding Claims comprising means for attachment of the device to a surface.
- 25
14. A device as claimed in any one of the preceding Claims wherein the member is rotatable in the housing in a clockwise direction relative
to an axis of rotation and in an anti-clockwise direction relative to the axis.

15. A device as claimed in any one of the preceding Claims wherein there is provided a plurality of earpiece locaters.
 - 5 16. A device as claimed in any one of the preceding Claims wherein at least a portion of the cable is pre-wound on the member so that, in use, the wound cable comprises an inductor.
 17. A storage device for an electrical cable substantially as hereinbefore described and as illustrated in the accompanying drawings.
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Claims searched: 1-13 (30.06.1999) 1-4, 6-14 Date of search: 22 June 2000
and 17 (14.06.2000)

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.R): B8M (MB7)
Int Cl (Ed.7): H02G 11/02; H04M 1/15
Other: Online: EPODOC, WPI, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
Y	GB 2166115 A (COWLING) Fig. 1-3 and line 39 of page 1 to line 32 of page 2	1, 4-8, 13, 14,
A	US 5832098 (CHEN) Fig. 1-4 and line 56 of column 2 to line 10 of column 3	
X	US 5684883 (CHEN) Fig. 2-8 and line 55 of column 1 to line 58 of column 2	1, 6, 7, 12, 14
Y	US 4802638 (BURGER & MCKEE) Fig. 6-12 and line 56 of column 2 to line 7 of column 3 and line 20 of column 2 to line 38 of column 5	1, 4-8, 13, 14,
A	US 3782654 (KASA) Fig. 4 and 5 and line 56 of column 3 to line 55 of column 4	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.